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Best Management Practices for Dairy Production

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What are Best Management Practices?

Best Management Practices or BMPs refer to operating techniques and good housekeeping principles for reducing and preventing environmental problems. The overall philosophy behind BMPs is to conduct everyday activities in a more environmentally sound manner, recognizing that it may not always be practical to control or manage pollution after it is generated. By using BMPs, a facility can help protect the environment, save money, and improve community well-being all at the same time.

Why implement Best Management Practices?

While livestock waste is the most significant and consistent odor source, dairy operations have a number of sources that can potentially generate odors or pollute ground water or surface water resources, including:

- parlor waste
- cattle
- spilled feed
- silage leachate
- open feed lot operations (uncontained runoff or runoff which is collected in a setting basin and holding pond)
- confinement operations (confinement buildings, manure collection systems, storage systems, livestock manure handling facilities, or lagoon treatment systems)
- dead animal disposal
- waste milk handling and disposal
- line cleaning wastewater

BMPs can help dairy producers comply with environmental requirements and improve their performance over the long term. Most BMPs are based on common sense and some can be implemented quickly and at low cost, through simple changes to general housekeeping procedures or waste handling changes.

How can I implement Best Management Practices?

The purpose of this factsheet is to help dairy producers identify BMPs that will improve their operations and reduce the potential for generating odors and release of contaminants to ground water and surface water resources. Because each facility is unique, not every practice may be suitable. Each suggested BMP should be judged on a case-by-case basis, taking into account the conditions, operations and limitations of each facility. Dairy producers are encouraged to individualize the BMPs to their operations and site conditions, and to develop their own solutions for preventing pollution.

The BMPs listed below are divided into four categories, covering a specific operation or management task.

Grounds - BMPs involving the grounds at dairy production facilities emphasize common sense and consideration for your neighbors. Below are examples of BMPs activities that you may be able to implement at your facility:

- locating the facility as far as possible from surface water bodies
- locating the facility in an area with sufficient soil drainage
- planting wind breaks and buffer strips around the facility
- diverting rain water and other clean water away from areas where it could become contaminated
- maintaining proper gravel cover and landscape gradient so that water does not stand in access roads and around the production facility
- scraping away manure in open feed lots to reduce buildup of solids and to control odor and fly production
- collecting runoff from lots in settling basins for subsequent land application
- immediately load manure into a manure spreader and directly applying to the field
- removing spilled feed promptly
- keeping feeder equipment in good repair
- keeping watering devices in good repair

Buildings - Routine maintenance and good housekeeping practices are the two easiest ways to prevent pollution in buildings. Some ways that you can use BMPs in buildings are:

- constructing interior surfaces with smooth materials to reduce dust and grime accumulation and facilitate cleaning
- maintaining adequate ventilation in the building to prevent buildup of dusts, gases, moisture and heat
- preventing liquids from collecting under animals and watering equipment by using slotted floors or other technologies
- repairing leaking water lines immediately
- maintaining clean and dry buildings
- installing an underfloor ventilation system in confinement buildings where below floor storage is used
- using a power washer when hosing down walls, dividers and floors in order to reduce water usage
- covering feeders and extending feed downspouts to minimize dust
- scraping off or flushing away manure in confinement areas on a frequency which is adequate to minimize odors
- covering sumps at lift stations
- pumping manure from accumulation areas to storage areas on a frequency which is adequate to prevent odors and overflow

Wastewater - Parlor waste is commonly found discharged to roadside ditches, creeks, streams, etc. However, it is a violation of the Illinois Environmental Protection Act to discharge parlor waste as it contains a significant amount of nutrients and carries waste milk with a biochemical oxygen demand over 100,000 mg/L. Parlor waste should be land applied at agronomic rates using the following opportunities to manage and reduce parlor waste:

- use a tank or catch basin for short term parlor waste storage
- direct the parlor waste to existing waste management structures
- minimize volume of water used in the milking parlor

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Silage leachate is generated at silage bunkers, silage tanks, or from silage bagging operations. Similar to parlor waste in biochemical oxygen demand (79,000 mg/L), it is a violation of the Illinois Environmental Protection Act to discharge silage leachate. Management of silage leachate can be accomplished using the practices listed above for the handling of parlor waste.

Lagoons, settling basins and holding ponds that are undersized or poorly designed can cause pollution. Below are some examples of ways to improve your lagoons, settling basins and holding ponds:

- locate lagoons, settling basins and holding ponds away from valley type topography which can trap odors in low lying areas
- construct lagoons, settling basins and holding ponds so that wastes do not overflow or leach into groundwater and so that odor is minimized
- cover the lagoon, settling basin or holding pond to reduce surface odor release
- add aeration
- pump or drain manure to a lagoon in small enough quantities to avoid slug loadings, to maintain a stable microbial population within the lagoon
- maintain sufficient storage capacity to prevent overflow of lagoons, settling basins and holding ponds
- use a pump and a solids separator to reduce solids loading
- remove sludge from the primary lagoon frequently enough to prevent overloading or carryover of solids to a second stage lagoon

- equip lagoons and holding ponds with a free-board gauge so that it can be determined when it is necessary to pump out and land apply supernatant and prevent overflows
- dewater lagoons no more than the minimum treatment volume level as indicated on the lagoon marker
- fill new or emptied lagoons with water to the minimum treatment level before manure is introduced

Land application - Manure as a fertilizer can be environmentally beneficial. However, there are additional opportunities for reducing pollution when applying the manure to the land. Some examples of BMPs in land application practices are:

- develop a manure management plan
- schedule application times that are compatible with crop rotations
- have sufficient land available to land apply during various times of the year so that the rate of application will be at or below agronomic rates
- locate land application sites away from valleys
- apply manure on fields that are not highly erodible
- apply manure early in the morning until early afternoon
- apply manure on days with low humidity and little or no wind
- apply manure at a site remote from neighboring residences if manure is not injected or immediately incorporated into the soil
- apply manure on land that is not frozen or snow-covered
- prevent contaminated runoff by not applying manure to land which is saturated or contains ponded water
- prevent contaminated runoff by not applying manure near a creek or river or fields adjacent to them
- prevent contaminated runoff by not applying manure during precipitation or when precipitation is imminent
- inject manure with a tank wagon equipped for manure injection
- determine the necessary application rate and properly calibrate your equipment
- use injection equipment which leaves crop residue intact and creates a level surface to plant crops without further tillage
- irrigate crop less fields at low enough rates to allow liquid manure to be incorporated within 24 hours of application
- apply liquid wastes at low pressure with little agitation if spreaders or sprayers are used to land apply
- seal manure application equipment and clean disks used to incorporate manure if travel on public roads is necessary

How do I get more information or assistance?

The Illinois EPA will work cooperatively with dairy producers to find practical and cost-effective solutions to the environmental issues addressed using BMPs.

For general information contact:

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